

**REMARKS**

Please reconsider the application in view of the above amendments and the following remarks. Applicants thank the Examiner for carefully considering this application.

**Summary of Interview**

Applicants thank the Examiner for granting a telephone interview conducted March 3, 2010, and for the courtesy shown to Applicant and co-inventor, Siddhartha Gaur, Ph.D, and to the undersigned counsel for Applicants. During the interview the prior art cited and applied and the invention were discussed. No agreement was reached as to the patentability of the pending claims.

Applicants respectfully request that the amendments to the claims be entered and the application be reconsidered in view of the amendments, the evidence of difference between prior art products submitted by Declaration of Siddhartha Gaur, PhD, and the following remarks.

**Disposition of Claims**

Claims 1-112 are pending in this application. Claims 31-72 are currently under consideration. Claim 101 has been canceled. Claims 1-30 and 73-100, 101-112 have been withdrawn from consideration in this application. As amended, claims 31, 32, 33, 49, 50, 61, 62, and 72 are independent; claims 34-48 and 51-60 depend, directly or indirectly, from claim 31; claims 71 depends from claim 61; and claims 63-70 depend, directly or indirectly, from claim 61.

**Support for Claim Amendments**

Claims 31, 32, 33, 49, 50, 61-63, 70, and 72 have been amended herein.

Support for the amendment to Claim 31 can be found, for example, in original claims 32 and 48, in the third paragraph on page 5 of the specification, and in the second paragraph on page 12 of the specification.

Support for the amendment to Claim 32 can be found, for example, in original claims 31 and 48, in the third paragraph on page 5, in the second paragraph on page 12 of the specification, and in the first full paragraphs on page 21 of the specification.

Support for the amendment to Claim 33 can be found, for example, in original claims 31 and 48, in the third paragraph on page 5, in the second paragraph on page 12 of the specification, and in the first and second full paragraphs on page 21 of the specification.

Support for the amendment to Claim 49 can be found, for example, in original claims 31 and 49, in the third paragraph on page 5, in the second paragraph on page 12 of the specification, and in the first and second full paragraphs on page 21 of the specification.

Support for the amendment to Claim 50 can be found, for example, in original claims 31, 33, and 49, in the third paragraph on page 5, in the second paragraph on page 12 of the specification, and in the first and second full paragraphs on page 21 of the specification.

Support for the amendment to Claim 61 can be found, for example, in original claims 31, 32, 49, 62 and 70, in the third paragraph on page 5, in the second paragraph on

page 12 of the specification, and in the first and second full paragraphs on page 21 of the specification, and the sixth paragraph of page 27 of the specification.

Support for the amendment to Claim 62 can be found, for example, in original claims 31, 33, and 49, in the third paragraph on page 5, in the second paragraph on page 12 of the specification, and in the first and second full paragraphs on page 21 of the specification.

Support for the amendment to Claim 63 can be found, for example, in original claim 63.

Support for the amendment to Claim 70 can be found, for example, the last paragraph on page 23 of the specification.

Support for the amendment to Claim 72 can be found, for example, in original claim 61, and in the second full paragraph on page 25 of the specification.

Thus, these amendments are deemed fully supported by the original specification and no new matter has been added.

#### **Rejection(s) under 35 U.S.C § 112**

The previously amended claims were rejected under 35 USC 112, first paragraph for failing to comply with the written description requirement. The rejection on this basis is deemed moot because Applicants have amended the previously amended claims, by removing the terms “non-graphitic” in the preamble and “non-graphite” in the elements of the claims. The amended claims specify the carbon source materials and the feed modifier materials in terms of Markush groups of carbon feed source materials and feed modifier materials consistent with those disclosed in the specification. Reconsideration and withdrawal of the rejection in view of the amendment is respectfully requested.

For purposes of avoiding acquiescence to this rejection and to preserve Applicants' rights in the prosecution of this application, Applicants respectfully disagree with the rejection and believe that the original specification, when read as a whole supports the inclusion in the claims of a description of non-graphite carbon source feed materials and non-graphite feed modifier materials. Because the materials indicated in the specification are of the type known to be non-graphite, a claim describing such groups of materials as non-graphite are deemed in compliance with the written description requirement. It is respectfully submitted that using a descriptive term in the claims that addresses all the disclosed source materials is not the same as cases cited in the MPEP, where narrow percentage ranges of components are claimed within an otherwise disclosed wider range of percentages, without specifying the importance of the narrow range. In contrast to such "narrowing of ranges" cases, all the materials disclosed in the present application as carbon source materials were of a type that would be known by those skilled in the art to be describable as "non-graphite" and the claim was previously amended to describe the entire group of materials disclosed; not to arbitrarily select a narrower range of percentages from a broader range disclosed. Thus, claiming non-graphite carbon source and feed modifier materials was deemed supported by the specification in compliance with the written description requirement. Also, the end product carbon alloy, when made according to the disclosed and claimed process, will be understood to be "non-graphitic" because all of the disclosed carbon feed source and feed modifier materials were non-graphite materials and the process temperature at or below 1300°C as described and claimed is below the scientifically known temperature for the formation of graphite from other carbon materials. Claiming a non-graphitic carbon alloy

end product is also deemed supported by the specification in compliance with the written description requirement. While the foregoing disagreement with the Examiner's position is expressed herein to preserve Applicant's rights in the prosecution of this application, the rejection on this basis is deemed moot because Applicants have amended the previously amended claims, by removing the terms "non-graphitic" and "non-graphite." Nevertheless, the end product according to the process as claimed will be a non-graphitic carbon alloy, regardless of the language used to describe it. The amended claims specify the carbon source materials and the feed modifier materials in terms of Markush groups of carbon feed source materials and feed modifier materials consistent with those disclosed in the specification, the claimed temperature of the process is below the temperature generally known for any significant formation of graphite. Reconsideration and withdrawal of the rejection in view of the amendment is respectfully requested.

**Rejection(s) under 35 U.S.C § 102 or 35 U.S.C. § 103 over US Pat. No. 4213956, (Ubbelohde)**

Claims 31-72 stand rejected under 35 U.S.C. § 102 as anticipated by or, in the alternative obvious under 35 U.S.C. § 103 over 4213956 (Ubbelohde.) Claims 31-33, 49, 50, 61-63, 70, and 72 have been amended in this reply. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed for at least the following reasons.

Carbon alloys have combinations of carbons with different hybrid orbital, for example ( $sp$  and  $sp^2$ ), ( $sp$  and  $sp^3$ ), ( $sp^2$  and  $sp^3$ ), or ( $sp$  and  $sp^2$  and  $sp^3$ ). Graphite has primarily only one type of carbon-carbon hybrid orbital bond. A given carbon containing feed material can have among the carbon bonds, hybrid orbital bonds formed

by various types of hybrid orbitals. (See Gaur Declaration, paragraph 4)

Applicants' amended claim 31 sets forth selection of carbon source materials and feed modifier materials consisting of materials from respective groups that provide carbon materials having more than one type of carbon-carbon bonding. Amended claim 61 sets forth the selection consisting essentially of a plurality of carbon source materials from a group that provides carbon source materials with more than one type of carbon-carbon bonding. It will be noted that claim elements that use the limitation "consisting of" or "consisting essentially of" in the individual steps of a process do not encompass a broader scope of the materials, even in a claim wherein the preamble is for a process "comprising" steps as set forth in the body of the claim. See, *Dippin' Dots v. Mosey*, 476 F.3d 1337 (Fed. Cir. 2007). The materials in the individual steps in the body of claims 31 and 62 are limited to the scope of such materials indicated by the "consisting of" limitation or the "consisting essentially of" limitation. The use of "comprising" in the preamble does not expand the limitations of such individual steps in the body of the claim. *Dippin' Dots v. Mosey, supra*. As such, it is respectfully submitted that claims 31 as amended should not be read to include source materials or feed modifier materials beyond those as established by the Markush groups in the body of the claim. Claims 31 and 61 as amended should not be read to include source materials beyond those as established by the Markush groups in the body of the claims.

For purposes of further differentiating the scope of claims 32, 33, 49, and 50 from claim 31 and for differentiating Claim 62 from claim 61, the preambles of claims 32, 33, 49, 50, and 62 have been amended to replace "comprising" in the preamble with "consisting essentially of" the indicated steps. Where the specific feed source and feed

modifier materials in the steps are also from a group “consisting of” or a group “consisting essentially of” the materials must be selected from those groups of materials. None of the materials either in the carbon feed source group or in the feed modifier group is a graphite material.

The quantities of the different types of hybrid orbital bonds in a given carbon source materials is not always equal or not always in a same proportion. Nevertheless, there will be different types of orbital bonds in the source materials so that the end product will be a carbon alloy (i.e., a carbon bonded material composed of more than one type of carbon-carbon hybrid orbital bonding). In the molded carbon alloy product as claimed by Applicants, there will be at least two types of hybrid orbital carbon bonding, this is deemed to be the nature of a carbon alloy; the claimed end product. The lists of feed source materials in the specification, and in the amended claims are non-graphitic materials. Those of ordinary skill in the art will recognize that the claimed carbon source materials and the feed modifier materials are not graphitic. The process for making the product as claimed is conducted below the temperature of 1300°C, generally considered a the temperature below the temperature for initiation of graphite formation. Starting with materials that consist of or that consist essentially of non-graphitic materials and processing the materials to form a product without reaching temperatures at which graphite forms, makes it clear that the molded carbon alloy product produced according to the process as claimed will be different from any and all of the graphite products described in Ubbelohde. (See Gaur Declaration, paragraphs 5 & 6) It will be noted that claims 31, 32, 33, 49, 50, 61 and 62 retain the requirement for process temperature at or below 1300°C and claim 72 has been amended to set forth, in part and in combination

with other elements, “the application of heating below the graphite formation temperature for carbon.”

In Ubbelohde both of the materials selected for making the product contain graphite and these are specifically selected for the graphite content and at every stage whether optional or not, the source materials and the product are graphitic. The purpose is to produce a resulting product or material with graphite. Moreover, in Ubbelohde the intended product is aligned graphite. In the part of the process that might be considered optional by the Examiner, elevated temperatures are intended to be employed to obtain more complete graphitization of the already existing graphite material.

The declaration of Siddhartha Gaur, PhD, attached hereto (the Gaur Declaration) together with the product testing evidence in the form of a graphical presentation of comparison test data, supported by the Gaur Declaration, clearly indicates that graphite has a distinctly different low reactivity “signature” compared to the high reactivity of samples of different carbon alloy products both made according to variations of the process as claimed. One carbon alloy sample (sample A) made according to one variation within the scope of the claims has a relative reactivity that is double that of graphite and a second carbon alloy sample (sample B) made according to another variation within the scope of the claims has a relative reactivity that is more than 10 times that of graphite. Thus, it is respectfully submitted that distinct differences exist between the graphite containing product of Ubbelohde and the molded carbon alloy as claimed by Applicants. Ubbelohde does not anticipate Applicants’ claimed product and Applicants’ claimed product would not have been obvious in view of Ubbelohde.

In view of the above, Ubbelohde fails to show or suggest the present invention as



recited in claims 31-33, 49, 50, 61-63, 70, and 72 as amended. Thus, the claims 31-33, 49, 50, 61-63, 70, and 72 as amended are patentable over Ubbelohde. Dependent claims are allowable for at least the same reasons. Accordingly, reconsideration and withdrawal of the rejections based upon Ubbelohde are respectfully requested.

**Rejection(s) under 35 U.S.C § 102 or 35 U.S.C. § 103 over US Pat. No. 3867499, (Morgan)**

Claims 31-72 stand rejected under 35 U.S.C. § 102 as anticipated by or, in the alternative, obvious under 35 U.S.C. § 103 over 4213956 (Morgan.) Claims 31-33, 49, 50, 61-63, 70, and 72 have been amended in this reply. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed for at least the following reasons.

Applicants respectfully disagree and hereby traverse the Examiner's assertion that the Examiner sees no difference in Applicants' product, one with a plurality of different hybrid orbital carbon bonding, and the carbon fiber products of Morgan in which all of the source materials (acrylic polymer in a solvent) for making "high modulus carbon and graphite fibers" provides a single  $sp^2$  type of hybrid carbon bonding. The product, made from acrylic polymer fibers, even at intermediate stages, is not by definition a carbon alloy. The acrylic fibers produced as a precursor to the graphite fiber end product in Morgan are not carbon alloy materials. The ultimate end product of Morgan is clearly a graphitic material. (See Gaur Declaration, paragraph 7) Applicants' claims 31, 32, 33, 49, 50, 61, 62 and 72, all set forth carbon source materials (and feed modifier materials if any are claimed) that provide more than one type of carbon-carbon bonding. It will be

noted that even in a claim wherein the preamble is for a process “comprising” steps as set forth in the body of the claim, the use of the limitation “consisting of” or “consisting essentially of” in the individual steps of a process will not broaden the scope to include graphite materials not set forth in the claims. See, *Dippin’ Dots v. Mosey*. 476 F.3d 1337 (Fed. Cir. 2007). Also, in claims 32, 33, 49, 50, and 62, even the preamble has been amended to limit the steps to those “consisting essentially of” the indicated steps. The specified feed source and specified feed modifier materials in the steps are also from a group “consisting of” those from the indicated groups as set forth in claims 32, 33, 49, 50, 61, 62, or 72. None of the materials in either the feed source group or the feed modifier group is deemed to be a graphite material. The final product of Morgan is further intended to be heated to above about 1800°C to convert the thin extruded acrylic filaments into graphite. As indicated in the Gaur Declaration and the supporting comparison testing results presented, graphite materials have a different reactivity signature from the carbon alloy products produced according to the claimed invention. Whether at the initial stages or after the heating stage, the resulting product will have a single type of  $sp^2$  hybrid orbital carbon bonding and are therefore not carbon alloys as claimed. Moreover, the Morgan product is not a molded product as in amended claims 32, 33, 49, 50, 61, 62, or 72. Thus, it is respectfully submitted that distinct differences exist between the product of Morgan and the molded carbon alloy as claimed by Applicants. Morgan does not anticipate the claimed product and Applicants’ claimed product would not have been obvious in view of Morgan.

In view of the above, Morgan fails to show or suggest the present invention as recited in the claims 31-33, 49, 50, 61-63, 70, and 72 as amended. Thus, the claims 31-

33, 49, 50, 61-63, 70, and 72 as amended are patentable over Morgan. Dependent claims are allowable for at least the same reasons. With regard specifically to claims 51, 61, 65, 66, 67, 68, 69, 70, and 71 specific dimensions are included in the claims that further differentiate the claimed invention from the extruded filaments of Morgan. Accordingly, reconsideration, withdrawal of this rejection and allowance of claims 31-72 are respectfully requested.

**Rejection(s) under 35 U.S.C § 102 or 35 U.S.C. § 103 over Tither et al., article, (Tither)**

Claims 31-72 stand rejected under 35 U.S.C. § 102 as anticipated by or, in the alternative, obvious under 35 U.S.C. § 103 over 4213956 (Tither.) Claims 31-33, 49, 50, 61-63, 70, and 72 have been amended in this reply. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

For the following reasons, this rejection is respectfully traversed.

In Tither the resulting product was mainly graphitic with only some sp<sup>3</sup> bonding present. The intent was to obtain a thin film deposition of graphite (sp<sup>2</sup>) and the resulting film had only a small part of sp<sup>3</sup> bonding present in the film. Initially, it is respectfully submitted that this is not a carbon alloy according to Applicant's claim and on that basis should not be considered as the same product claimed by Applicants. (See Gaur Declaration, paragraph 8) Further, although Tither describes vapor deposition onto polished substrate material, where the substrate surface might be at a temperature of 500°C, that is only a reference to the temperature of the substrate, and there is no indication of the actual vaporization temperature at which graphite vapor is produced for deposition onto the substrate. It is respectfully submitted that because the melting and

vaporization temperatures of carbon would be much higher than 1300°C and the graphite formation temperature is higher than 1300°C, the vaporization portion of the Tither process produces a graphite product that is different from the product of the claimed invention. The claimed invention process uses feed materials in a group that are known not to include graphite (similarly in claims with feed enhancement materials or feed modifier materials they are also selected from groups that are non-graphitic) and the claimed process is conducted at temperatures at or below 1300°C, i.e., below the graphite formation temperatures, such that the product is not graphitic. The Tither product is intentionally graphitic with only impurities of other carbon materials. The products are different.

The Examiner asserts that a deposited film can be considered a molded product having three dimensions that is the same as Applicants' claimed product. Applicants respectfully disagree. The vapor deposition onto a polished substrate is not the same as the claimed molded product. Moreover, reference in earlier actions to rolling together of thin sheets of graphite to try to align the graphitic plates, does not support the assertion that thin film deposition is the same as the molded shaped product as claimed by Applicants. If the assertion that vapor deposition of a layer of graphite can be considered to be a molded product is based upon official notice by the Examiner's own personal knowledge, then Applicants respectfully request an affidavit by the Examiner supporting that assertion under 37 CFR 104(d)(2). According to Applicants' claim 31, the claimed product is characterized as "a molded carbon alloy." The Tither product is a deposited film on a polished substrate; it is not under any reasonable interpretation of the word "molded" a molded product. Moreover, the claimed product is made by a process

entirely at temperatures only up to 1300°C, thereby eliminating the formation of graphite, and a thin film primarily of graphite is not the same product as claimed by Applicants. With regard specifically to claims 51, 61, 65, 66, 67, 68, 69, 70, and 71 specific dimensions are included in the claims that further differentiate the claimed invention from the thin film of Tither.

In view of the above, Tither fails to show or suggest the present invention as recited in the claims 31-33, 49, 50, 61-63, 70, and 72 as amended. Thus, the claims 31-33, 49, 50, 61-63, 70, and 72 as amended are patentable over Tither. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

**Rejection(s) under 35 U.S.C. § 102 or 35 U.S.C. § 103 over Tanabe et al., article, (Tanabe)**

Claims 31-72 stand rejected under 35 U.S.C. § 102 as anticipated by or, in the alternative, obvious under 35 U.S.C. § 103 over 4213956 (Tanabe.) Claims 31-33, 49, 50, 61-63, 70, and 72 have been amended in this reply. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

For the following reasons, this rejection is respectfully traversed.

The Tanabe article sets forth a proposal for research into the area defined as carbon alloys, but does not indicate how to make carbon alloy products. It is respectfully submitted that Tanabe does not demonstrate that the invention of any such products was in the possession of Tanabe at the time of the article. There is no suggestion of how to make carbon alloy that does not include graphite. It was merely a proposal for research.

(See Gaur Declaration, paragraph 9) Whether the abstract suggested the possible existence of a carbon alloy does not show that Applicants' product as claimed was disclosed. It was not. That is a little like a science fiction writer proposing that there should be a study of vehicles that might carry humans to another galaxy or through magma to the center of the earth at a time when there is no teaching of how to make such vehicles. This is not prior art that would anticipate or make obvious a specific product, namely a molded carbon alloy product made by a process as claimed by Applicants and a process that by its parameters excludes graphite. For example, there is no mention of the specific structure of such a product in the article, such that a molded three-dimensional carbon alloy product defined by process by which it is produced as claimed by Applicants is not shown or suggested in the Tanabe article.

In view of the above, Tanabe fails to show or suggest the present invention as recited in the claims 31-33, 49, 50, 61-63, 70, and 72 as amended. Thus, the claims 31-33, 49, 50, 61-63, 70, and 72 as amended are patentable over Tanabe. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

In view of the above, all of the references cited and applied fail to show or suggest the present invention as recited in the claims as amended. (See also Gaur Declaration, paragraphs 10-12) Thus, the claims as amended are patentable over the references cited and applied. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

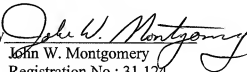
Applicants believe this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other

issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. The fee for filing of an RCE is submitted herewith by credit card payment authorization. While it is believed that this response is filed within the shortened statutory time from the re-sent final office action mailed April 28, 2010 after it was originally mailed December 3, 2009, to a wrong address (one that should have been changed to correspond to the customer number associated with this application), in the event that the time period for response was not restarted by the re-mailing of the final office action, please consider this a request for three month extension and charge the required large entity extension fee of \$1,110.00 to Deposit Account 50-0591 (Reference Number 17133/002002). Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 17133/002002).

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below.

Dated: June 3, 2010

Respectfully submitted,

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